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# The Technology Review

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## A BROAD SCHEME OF COÖPERATION WITH STATE

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Special Committee presents report which is discussed by Alumni Council—  
Plans include all institutions of higher learning in the State—Definite recommendations made—Other reports presented

The May meeting of the Alumni Council was a memorable one, because it marked the presentation of the report of the Committee on Coöperation between Technology and the Commonwealth of Massachusetts, a report notable not only for its scope and thoroughness, but chiefly because it is the first occasion where a state and a prominent independent educational institution has coöperated to establish the most effective, mutual relations.

The committee which had this matter in charge consisted of J. F. McElwain, '97, chairman, president W. H. McElwain Company; Judge F. Meaney, secretary to the governor, representing the Commonwealth of Massachusetts; Professor D. C. Jackson, consulting engineer, head of Department of Electrical Engineering, M. I. T., representing the Institute; M. C. Brush, '01, vice-president Boston Elevated Railway Company, representing the public utilities of the state and its business interests; Robert G. Valentine, industrial counselor, formerly commissioner of Indian affairs in the Department of the Interior at Washington, chairman of the first Minimum Wage Board, representing the interest of labor. The president of the Alumni Association.

Mr. Whiting, and its secretary, Mr. Humphreys, were *ex-officio* members of the committee.

The investigation has been an exhaustive one, covering several months, and has dealt not only with the conditions and needs of the Commonwealth and the facilities that might be afforded by the Institute, but has taken into consideration the activities of institutions in other states, whether controlled by the state or otherwise. It has also considered not only the possible relations of the Institute with the state, but broadly covers the higher institutions of learning in Massachusetts, of which there are some seventeen, each of which could contribute some special service. The attempt has been to reach a definite end and to find a basis of coöperation that might be worked out in a practical way. Considerations in the present report were, however, limited to the needs of the State alone without taking into consideration what might be done for municipalities, towns and the people at large.

In the report three recommendations were made:

First, the increased use of the services of members of the Faculty of the Institute and other institutions of learning, on



state boards and commissions, either as members or in an advisory capacity, referring especially to state commissions which conduct work requiring scientific or technical skill or advice.

The second recommendation is that the State make use of the laboratories or shops of the Institute under conditions which will safeguard the educational purpose of the Institute and the administrative needs of the State, no direct charge to be made for the use of these laboratories, but the State to bear the expense of labor and material, plus a fixed sum to be added to cover the wear and tear and depreciation.

The third item is the suggestion of the committee that the Institute establish a bureau of technical information which shall furnish advice to the State and the public, giving ordinary scientific information or indicating the lines of inquiry to be followed.

In order to carry into effect these recommendations, it was suggested that the Governor appoint a permanent committee on coöperation which shall carefully study the needs of the State and the possibilities of closer coöperation between it and the Institute, and the means for making such coöperation effective.

The report of the committee on coöperation between Technology and the Commonwealth, which will appear in the July REVIEW, was accompanied by voluminous exhibits covering the following points: Exhibit A—Record of the meeting held at the Executive Department of the Commonwealth, Saturday, May 21, on the subject of the coöperation of the Massachusetts Institute of Technology and the Commonwealth of Massachusetts; Exhibit B—Biology in the service of the State; Exhibit C—Instances of coöperation between the State and the Institute; Exhibit D—An incomplete outline of the organization of the State of Massachusetts; Exhibit E—Coöperation between governments and universities elsewhere; Exhibit F—Statement of Dean Goss of the University of Illinois, regarding coöperation; Exhibit G—How science helps industry in Germany; Exhibit H—

Physical equipment of the Massachusetts Institute of Technology; Exhibit I—Administrative and instructory staff of the Massachusetts Institute of Technology, 1913.

In bringing the committee report to the attention of the meeting, President Whiting noted that not only was there considered the narrow problem of the State and Technology, but the subject was taken up in the broader fashion that would extend coöperation and make in reality a state-wide university, qualified as no individual university can possibly be for the purposes of conferring with the State on important technical and governmental questions. Mr. Whiting paid tribute to the faithful and complete work of the committee and said in closing that it is due to the initiative of Governor Walsh that the problems have been thus crystallized.

After the reading of the report President Maclaurin was presented who, after commenting in complimentary terms on the scope and completeness of the report, said that the breadth and spirit in which the problem has been considered evolves it into one of unusual magnitude. It is one of the biggest things in the educational world because it is going to bring together in hearty coöperation all the higher institutions of learning in the Commonwealth. "We are here tonight," said Dr. Maclaurin, "at the inception of one of the greatest movements that has been set going in our times, and it is particularly fortunate in its planning in that it brings in all of the institutions at the beginning."

Dr. David Snedden state commissioner of education was next introduced, who commented on the comprehensiveness of the report, stating that it opens up a remarkable vista. It is the more interesting from the point of view of the commissioner because the Board of Education has been requested by the Legislature to prepare a plan for a state university for the next General Court. The report will help the board in this.

Dr. Snedden commented particularly on that portion of the report that had reference to the collection of information

and the "Information Bureau." He stated that his board is constantly in receipt of inquiries for which it has no means of getting replies. There is the greatest need for means of getting at information. Instancing some matters where correlation of information is desirable, the speaker noted that practically nothing has yet been done towards proper schools for rural districts. The sanitary problems are in great need of consideration. Ventilation is another matter where the best advice of scientific men is greatly to be desired. Then there is the problem of the industrial school. There is no authority in the matter today. The problems of the right adjustments are perfectly capable of solution, but as yet these have not been attempted in a scientific and consistent matter. Dr. Snedden expressed himself as in sympathy with the report and considered it eminently practical.

Hon. R. G. Valentine expressed his opinion that the plans which are here outlined get to the very root of what democracy must be if democracy is to succeed. The greatest hope for government by the people lies not merely in the ballot, but in other places in debates that are going on in various circles, in groups, associations and in trade unions. In the movement of all forms of organization the strong thing is that every one of them is looking more and more to science, "and," continued the speaker, "it is only by tying up to science and scientific lines of thought that there is hope for democracy."

The State spends, according to the ex-commissioner, about \$100,000,000 a year in things that it chooses to do, but there is spent by the people, for matters that they choose or allow to be wasted, a value several times as great. There is the waste of forests, lack of development of streams and other neglected matters to conserve; there is the enormous loss by fire—largely preventable—and the care of the insane and criminals. "The great task of science is to get into the game of prevention," said Mr. Valentine in closing, "and the harnessing of the many scientific forces of educational institutions to the State will be fruitful."

Professor Arthur A. Noyes, '86, in briefly adding his opinion to those already expressed, said that the movement has been originated at about the right time. In the past, so far as Technology is concerned, there has been the increasing crowding of the laboratories, which has put out of the question a very large amount of public work. With the New Technology the situation will be that of greater space and better opportunities.

The speaker suggested the possibility of utilizing Rogers and Walker, the buildings on the Boylston street land that probably must be retained by the Institute for years to come, for the public utilities that have been outlined in the report. The new opportunities will afford to the Institute many chances to be of service to the State, and Professor Noyes voiced the opinion that it is ready to do everything that it can do consistent with its first duty, the education of its own students.

Edwin S. Webster, '88, spoke of how the electrical research laboratory at the Institute is now at work on problems of great public importance, and how well prepared we are to take up research in matters of great consequence to the State.

A number of other matters were considered by the Council. F. H. Hunter, '02, reported for the committee created to nominate men for the advisory councils on student activities. In his report, Mr. Hunter recommended that the undergraduate member of the committee be made chairman in order to place the responsibility in the hands of the students. The nominations which were endorsed by the Council are as follows: For the Advisory Council for *The Tech*: Richard H. Ranger, '11, for three years; Thomas E. Sears, '03, for two years; Grosvenor D'W. Marcy, '05, for one year. For the Finance Committee: Stanley G. H. Fitch, '00, for three years; Howard L. Coburn, '98, for two years; Clarence W. Brett, '13, for one year. For the Advisory Council for the Tech Show: Alexander Macomber, '07, for three years; Professor Edgar I. Williams, '08, for two years; Harold E. Kebbon, '12, for

one year. For the Advisory Council for the Musical Clubs: Professor George E. Russell, '00, for three years; Professor Edward E. Bugbee, '00, for two years; Herbert T. Gerrish, '08, for one year. For the Advisory Council on Athletics: Dr. J. Arnold Rockwell, '96, for four years (and eligible for re-election); Professor Allan W. Rowe, '01, for two years (and eligible for re-election); Henry E. Worcester, '97, for three years; Lloyd C. Cooley, '12, for two years; Carl W. Gram, '09, for one year.

At the last meeting of the Council it was voted to appoint an alumni committee to take up the problem of building dormitories on the New Technology site. President Whiting appointed J. P. Munroe, '82, chairman; A. C. Anthony, '86; A. T. Bradlee, '88; Charles W. Eaton, '85; and Frank A. Merrill, '87. Mr. Munroe made a report of progress for this committee, which has not yet had opportunity to go very far into the matter.

H. C. Turner, '03, made a report of progress for the committee on publicity. Leonard C. Wason, '91, made a report of progress for the committee appointed to consider the problem of the M. I. T. undergraduate coöperative society.

Some time was given to the discussion of the form which the forthcoming *Register of Former Students* should take. Professor Bartlett, chairman of the Faculty committee on publications, stated that in response to his letter of inquiry the great majority were desirous of having the main index an alphabetical one, and to also have an index by classes as well as the present geographical index. The discussion became general, and a vote of the Council showed that the members present were unanimously in favor of the alphabetical list.

### The Tech and the Cup Defenders

The Institute of Technology has much interest in the coming international races to contest for the *America's cup*, because Tech men have played important parts in the building of both the *Defiance* and the *Resolute*.

The *Defiance* was designed by George Owen, '94, of Newton, Mass., and was built at the Bath Iron Works, Bath, Maine, the president of this institution being John S. Hyde, '89. Two members of the syndicate that built the *Defiance*, E. S. Webster, '88, and Charles Hayden, '91, are Tech men. The measurements of the *Defiance* were taken at Bath by Professor Harold A. Everett, '02, of the Department of Naval Architecture and Marine Engineering, of the Institute.

The *Resolute* was designed and built by Nathaniel G. Herreshoff, '70, of the Herreshoff Manufacturing Company, Bristol, R. I.

It has been suggested that the Alumni Association arrange for a boat to follow the trial races on the Sound, so that alumni who wish to attend can be accommodated, but this suggestion has not been found practicable.

### Cleveland-Detroit Outing

Judging from the preparations that the Cleveland and the Detroit Technology Clubs are making for their annual get-together field day at Put-in Bay, June 20, there will be a lively time at that favored resort when the happy day arrives.

Both the Detroit and Cleveland clubs have grown very strong during the past few years, and they are not only loyal to Technology, but also to their own localities. The feeling of rivalry runs high, and the various contests which are likely to be pulled off will have an unusual flavor of excitement.

### Tech Wins Over Holy Cross

At the dual meet on the Tech field, May 2, between Technology and Holy Cross, the Institute easily won by 99-1/16 points to 25-5/6. The feature of the meet was the two-mile run by F. L. Cook, Technology, '15, who covered the distance in 9 minutes and 45 seconds, beating the Technology record made by S. M. Udale, '06, at the New England Intercollegiate Championship in 1907.



OLD PHOTOGRAPHS—M. I. T. ARTILLERY SQUAD DRILLING ON BOYLSTON STREET

## The New Athletic Field

Plans for the athletic field at the New Technology, given out by Major Frank Briggs, call for one of the best athletic fields in the country and the very best track it is possible to make. The work is expected to be far enough completed by next fall so that the track can be used at the beginning of the next school year.

The field will be located in the eastern part of the lot with its longest dimension parallel to Tech street, where the principal entrance to the stadium will be located.

The track, which is to be the fine point in the whole field, will be made as perfect as the Harvard track, with the added advantage of longer curves. The 220-yard straightaway will be wide enough to accommodate five runners, instead of four, in the hurdles. Another feature will be a concrete curb around the inside of the track.

Directly in front of the grand stand, space will be reserved for the jumps and weight events. The gridiron will be inside of the track and ample room will be left over for a baseball diamond, with room for two more diamonds in the vacant lots that may be added to the field. The tennis courts will be located between the gymnasium and dormitories.

A fence will probably enclose the field, and in this fence will be placed the gate of the old Tech field in Brookline. This gate, which was given by the class of 1881, will be removed the latter part of May and installed on the side of the enclosure that faces the river. The entrance to the grand stand will not be through this gate, but direct from Tech street.

The new track and field is expected to prove a big impetus to athletics at Technology. The present field in Brookline is very far away from the Institute and this fact keeps many men from coming out for the teams. With the start that is expected in the track showing this year, the future looks bright. Probably record squads will try for places on the Field Day teams next year to have the honor of being the first class to win a Field Day on the new field. The grand stand and enclosure will not be finished at this time, but the track and gridiron will be ready for use. There will also be a track in the new gymnasium, plans for which have not yet been completed.

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President Maclaurin will sail for England, where he will spend the summer, on Tuesday, June 30.

### Status of Boylston Street Site

The decision of the Supreme Court of Massachusetts with reference to the Technology land on Boylston street has served to clarify the situation in pointing out precisely what the limitations are. The general story of the situation is that when the Institute was chartered the State gave the land to it with the restriction that but one-third should be used for building purposes, and it has been generally understood that the estates across the streets that bound the grounds are entitled to the light and air that such limitations in building bring with them.

In 1903 the Legislature released its rights to the land but provided that no stable or building for manufacturing purposes should be built on it. In January of the present year, application having been made to the Land Court for a title, Judge Davis decided that the Institute had the title to its land, but that any sale or transfer must be subject to the restrictions that exist. To determine what these might be, the case was taken to the Supreme Court and it is the decision of this body that has just been expressed. The decision upholds the right of the Institute to dispose of the land, and here the same phrasing of "subject to the restrictions," is used. Judge Sheldon, who wrote the opinion, considers that the abutters having interest in the Technology lot are those on the opposite sides of Newbury, Clarendon and Boylston streets, and that abutters on Berkeley street have no rights.

The plain condition of the case is, therefore, that Technology can sell its land. This sale must however be subject to the restrictions of the use only of one-third of the lot and the qualifications as to kind of building to be placed thereupon. If, however, all parties at interest agree thereto, the restrictions may be removed by common consent.

The probabilities are, however, that the Institute will continue for a number of years to occupy the Rogers and Walker buildings with some of its activities, and the pinch of the shoe is that it will be necessary to appeal to generous donors

for sums with which to finish the New Technology by the Charles, for which under other conditions the sale of the Boylston street land would have provided.

### Connecticut Valley Outing

The summer meetings of the Technology Club of the Connecticut Valley have become noted throughout the East, and each year a larger delegation journeys to the Hartford Yacht Club, Saybrook, Conn., to enjoy the festivities.

This year the meeting will be held June 26 and 27. All Tech men are invited, and those coming from Massachusetts will rendezvous at Hartford, and take the 5 o'clock boat Friday afternoon, June 26, reaching Saybrook a little after seven.

The association has asked the REVIEW to extend a cordial invitation to all Tech men to attend this meeting, and it guarantees a good time.

### Erratum

In the May number of the REVIEW is a cut showing what purports to be the end of the Pierce Building, from the back of the Art Museum, taken about 1892. As a matter of fact, the Pierce building was not built until 1898 and the end of the building shown in the picture is that of Engineering B.



Through the courtesy of our classmate Bosworth, who is architecting the new Tech Buildings, we are enabled to publish the above view of the entire group as it will be seen from the Esplanade. The delicately refined simplicity of the composition will appeal to all of our delicate and refined readers, say we.

FROM THE QUARTER "CENTURION," PUBLISHED  
BY THE CLASS OF '89



## TO TEACH ENGINEERING ADMINISTRATION

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New course to be begun in the Fall is attracting much interest—General description of what it will comprise with an excerpt from the official Program

That the Massachusetts Institute of Technology will in future be able to graduate men who are not only trained in engineering but have a good working knowledge of the principles of business and its management is the interesting announcement of our President, Dr. Richard C. Maclaurin. The Institute has added to the curriculum Course XV, Engineering Administration.

Like a number of other important movements at Technology, the suggestions of this one comes well digested from the Alumni Council. Such a body, new to most educational institutions, has for long been a force for good at Tech. The Council includes a member from every class graduated, and being all of them technical men, their attention is turned in part to the efficiency of their school, and what is presented by this body has always been thoroughly discussed. A report of the Alumni Council on the subject of the new course has been printed, considered by business men, alumni and Faculty, and approved by the Executive Committee of the Corporation. Next autumn it is to be presented in the regular program open to second-year students.

In discussing the new course, Doctor Maclaurin notes that there are two usual routes open to the man who wishes to reach the head of a great industrial corporation; one is, as the shop phrase expresses it, "through the boiler room," and the other through the office. The one who begins at the bottom of the mechanical plant gets of necessity a thorough knowledge of the technical end of the work. He must acquire what is nearly as essential to him, the business knowledge, as best he can and usually in irregular fashion and from persons not experts in teaching. The man who enters the office must, to an extent, work down and will be obliged to learn as best he can something of engineering.

It is the purpose of the new course to take the middle way and afford to the students practical proportions both of engineering and of administration. The man who is graduated from Technology after following this new course will set out into practical life equipped with the essential things in the training of an engineer and a man of business. His later success will depend, as in all other cases, on his innate capacity and his power of profiting by the experiences of life.

The new course is not designed to make bookkeepers, auditors or accountants in any professional sense, but to furnish the fundamentals in these practices to business men holding administrative positions involving financial responsibility. The student will be instructed in the terminology of the accountant, will learn the places of assets, liabilities, good-will, franchises and the balance sheet; the meaning of profit and loss account, the theory and analysis of accounts in general and of depreciation. Cost accounting will be set forth in principle, with standard methods of determining costs not only of material but of processes, labor and machines. Distribution of indirect costs and overhead expenses will be shown, and the value of cost data toward economy together with various of the inventories and wage payment methods. There will be information given the student on the relative value of investments, of different kinds of securities, government, railroad, industrial, public utility, etc., and of different kinds of bonds. Bond tables, interest formulas, sinking fund calculations, serial bonds, amortization, and the mathematical theory of investment will be discussed. Then there will be set forth the functions of stock and produce exchanges, and of the broker, and of speculation.

In matters of transportation, it is proposed to introduce studies in handling

freight, terminal facilities and warehousing, together with the making of railway rates and the classification of freight. Then there will be considerations of the powers of the Interstate Commission. Export business will naturally bring with it some study of the nature of this business, ocean rates, customs regulations, tonnage duties and port regulations. Port and inland differentials will be discussed, and private car lines and special transit privileges.

In matters of industrial organization, the new course will enter into the study of the kinds of such organization from the individual to the trust or holding company, the differences in state corporation laws and the influences determining the choice of state in which to secure the charter. There will be lectures on the internal organization of the corporation, the directors, their duties and liabilities, the rights and responsibilities of the different factors to the corporation and the principles governing elections and meetings. Attention will here be paid to bookkeeping in its different departments, to the essentials in starting a corporation, promoting, underwriting and marketing stock. Financing of corporations, dissolution, reorganization, state supervision and taxation will be other items in the study of corporations.

The courses that consider business management will take cognizance of the organization of the establishment, the office systems, including cost accounting and production, including factory efficiency, standardization of goods, stock keeping and routing. There will then be the management of labor, selection and placing of employees, bonuses, efficiency methods, welfare inducements, and the training of the men. Marketing of goods will be an important item in its various methods, advertising will come in for its proper placing and the credit end of the business will be studied with reference to sources of credit information and means of collection.

In business law, the fundamentals of common transactions will be studied, contracts, agency, negotiable instruments, with perhaps some time given to torts and

patents, together with trademarks and unfair competition.

Students who wish to take the new course in engineering administration will find nothing different from the regular work during the first year. This is in general a series of studies in fundamentals and is much the same for all courses, indeed the student makes his choice during the second term. In the first term of the second year the hours devoted to political economy will be lengthened, and in the second term accounting and banking will find place. During the third year some of the options will be displaced by hours in industrial organization, statistics and report writing, and in the second term such studies will be increased in time. Here the students will begin with their work in transportation, industrial organization and securities and investments. During the fourth year cost accounting will be introduced, and business law and management together with studies of taxation and some work in psychology. The latter is to give the students who must be able to handle men some of the elements in such handling. The thesis, which will require about the normal time in preparation, finishes the work for the last year.

In the engineering studies a choice will be offered under three options—civil engineering, mechanical and electrical engineering, and chemical engineering. While the amount of time given to the engineering subjects is less than that prescribed in the other courses of the Institute, the fundamental subjects have been retained, which will enable graduates of this new course to fill many of the positions open to engineers. For example, the civil engineering option is intended to meet the needs of students who expect to enter upon administrative positions in organizations engaged in transportation or construction of works pertaining thereto, or in the development and distribution of hydraulic power. The option in mechanical and electrical engineering is planned to enable graduates to deal with engineering affairs other than the direct design and construction of plants. Its aim is to give a student

broad, general knowledge which, together with laboratory practice, will enable him to operate or to direct the operation of a mechanical or electrical plant. The chemical engineering option will prepare men to deal with economic administration, rather than scientific control of processes in industries devoted to the manufacture of such products as textiles, paper, leather, rubber, fertilizers, iron and steel, food and chemicals.

Approximately one-fourth of the total time of the curriculum is given to the business subjects and three-fourths to engineering and scientific branches.

#### IN LINE WITH MR. KINLEY'S IDEA

In this connection, the words of Vice-President Kinley of the University of Illinois, at the dinner of the Technology Clubs Associated, at Chicago are particularly *apropos*:

"I think that the great problems of construction are still to remain; although in certain fields, like railways, they are not to play so large and important a part in the future as they have in the past; but the greater problems of engineering in the future are to be problems of organization, administration and finance. The Panama Canal, the Assouan Dam, the Deep Waterways problem and all of these and many others you will think of more readily than I, are calling for men who are not only great constructive engineers but men who can coördinate and organize the resources of a vast nation or a group of nations for the accomplishment of a mighty purpose. They are men who know enough about finance to foresee and coördinate the factors that are necessary to success. They are men who know enough about human nature and the handling of men to take men in large groups as Goethals has done in the Panama Canal and make the engineering and administrative community.

"That, to me, is the prospect for the engineering of the future and that is what I mean by the new kind of engineering. The great problems of construction, as I say, will remain and the education necessary to train men to solve them will remain, but this new and, as I think,

higher education will call for a training of a somewhat different character. It will be a training, not neglecting the training in the technical subjects of construction and operation,—but it will be a training that will give a knowledge of men, that will give a knowledge of resources, that will give a knowledge of finance, that will give a knowledge of business organization, and such additional knowledge of law as will enable the engineer in charge of a great scheme to properly coördinate and organize all these various factors. What kind of an engineer will that be, and what kind of training should be furnished for such a career? I say that we will not neglect in that graduate or semi-graduate, construction that will undoubtedly be developed for such engineering, that technical training which we have seen so splendidly done in Boston in the past, but we will add to it a larger study of the things that pertain more directly to human life, history and economics, finance, business organization. We will add to it even more than we are trying to add to it now, a better knowledge of our own and of other languages. One of the things in which the engineer has failed in a great many instances has been that sufficient command of his own tongue to put his case winningly to the people who are going to finance his project; to present his reports in such a way that they carry conviction from the very reading of them. I have known of instances of failure from that very thing. That is not peculiar to the engineer. Far be it from me to say that he is a greater sinner in this respect than many of the rest of us, but the fact that the rest of us sin in that respect is no reason why he should continue to fall short, because his stake in a way is greater than that of many of the rest of us."

#### WHAT THE CATALOG SAYS

We take the following from the Program of the Institute now in press:

The Course in Engineering Administration provides a training for men who expect to enter positions concerned with the management or administration of manufacturing, construction, and transportation enterprises which demand a



knowledge of scientific and engineering principles. It combines with instruction in general engineering, studies in methods, economics, and law of business. The course includes (1) the instruction common to all courses, in literature, language, and history, and in chemistry, physics, and mathematics; (2) a choice of engineering studies classified under three options: civil engineering, mechanical and electrical engineering, chemical engineering; and (3) a selected group of subjects in business and economics. While the amount of time assigned to engineering subjects is less than that prescribed in the other courses of the Institute, the fundamental subjects have been retained which will enable graduates to fill many of the positions open to engineers.

Approximately one fourth of the total time of the curriculum is given to business subjects which are primarily chosen so as to train students to analyze commercial and industrial problems. In this group special emphasis is placed upon accounting, business law, the industrial organization of society, and business management. The course in accounting is designed to be of service to administrative officers in the analysis of accounts and financial reports, rather than to make bookkeepers, auditors, or accountants in a technical sense. Cost accounting includes methods of determining costs of material, processes; labor, and machines; distribution of indirect costs and overhead expenses; cost data to secure economy; and inventories. Business law treats of contracts, agency, negotiable instruments, sales, and patents. The two extended subjects of industrial organization and business management deal with the financial operations of corporations and the conduct of business from the standpoint of the individual employer. They include a treatment of the organization of the executive force, departmental functions, factory efficiency, standardization of goods, stock keeping, routing of orders, management of labor, efficiency methods, marketing of goods, publicity and advertising, credit department, insurance, and business ethics. Among other subjects included in the group of business

studies are banking, statistics, report writing, transportation, and securities and investments.

*Civil Engineering Option.* The civil engineering option is intended to meet the needs of students expecting to enter upon administrative positions in organizations engaged in transportation or the construction of works pertaining thereto, or in the development and distribution of hydraulic power. The course differs from the regular civil engineering course by the substitution of business subjects for some of the more descriptive optional subjects of the fourth year and for the following subjects of earlier years: astronomy, geodesy, geology, highway engineering, railroad drawing, stereotomy, and topographical drawing. That the graduates of this option will be well trained in the principles upon which the practice of civil engineering depends is ensured by the maintenance in the course of the fundamental professional subjects of surveying, railroad engineering, hydraulics, hydraulic engineering, structures and structural design, and of the allied professional subjects of heat engineering and electrical engineering.

*Mechanical and Electrical Engineering Option.* The option in mechanical and electrical engineering is planned to give a training in a sufficient number of the fundamental engineering subjects to make its graduates competent to deal with engineering affairs other than the direct designs and construction of plants. It includes many of the important subjects given in the regular course in mechanical engineering, omitting, however, such subjects as mechanism of machines, boiler design, physical chemical properties of engineering alloys, factory construction, power plant design, refrigeration, and heating and ventilation. The amount of time devoted to mechanic arts has also been reduced. The option differs from the course in electrical engineering in that less attention is given to design and to the more theoretical parts of electrical engineering, the aim being to give the students a general knowledge, which, together with the laboratory practice, should make them capable of employment in the oper-

ating or in directing the operating of electrical plants.

*Chemical Engineering Option.* The chemical engineering option affords instruction in the more important branches of chemistry and in the fundamental principles of mechanical engineering. The time devoted in this option to organic chemistry is much less, and that devoted to the other branches of chemistry is somewhat less than in the chemical engineering course. The training is, however, adequate to fit capable students to take many of the positions open to graduates of Courses V and X. The instruction in mechanical and electrical engineering is also less extended than that in the chemical engineering course. The primary purpose of the option is to give the information and training necessary to prepare men to deal with the economic administration, rather than with the scientific development and control of the processes involved in the industries devoted to the manufacture of materials, such as textiles, paper, leather, rubber, fertilizers, iron and steel, foods and chemicals.

### Rand Memorial Committee Plans

As was mentioned in the May number of the *TECHNOLOGY REVIEW*, a Rand Memorial Committee, consisting of members of the classes from '04 to '13 inclusive, has been formed. The committee consists of one representative from each class as follows: H. V. Coes, '06, chairman; V. L. Galusha, '05; William Green, '06; Howard B. Luther, '08; Arthur L. Shaw, '09; G. B. Reynolds, '10; Herbert Fryer, '11; H. E. Kebbon, '12; F. D. Murdock, '13; and Alexander Macomber, '07, secretary.

This committee, with the approval of the Executive Committee of the Alumni Association, took up the matter of the Rand memorial some weeks ago. It purposes that the memorial itself take the form of a perpetually endowed fireplace in the new Technology Union in Cambridge. The money will be raised among the members of the ten classes mentioned, and the committee will begin active work within a very few days.

The idea of an endowed fireplace seems to be particularly appropriate as a memorial to Mr. Rand, because it is typical of his cheering influence upon the students with whom he came in contact—and these were many.

Those who were most benefited were members of the classes mentioned above, and although a large number of professors, alumni and other friends of Mr. Rand were desirous of becoming identified with this memorial, it was thought best to confine this particular effort to the ten classes, leaving an opportunity for others to give tangible expression of their regard and affection in some other way.

The committee does not intend to take up an aggressive campaign, but will merely place the opportunity before the men of the ten classes so that they can take part in the movement if they so desire.

### French Medals for Tech Students

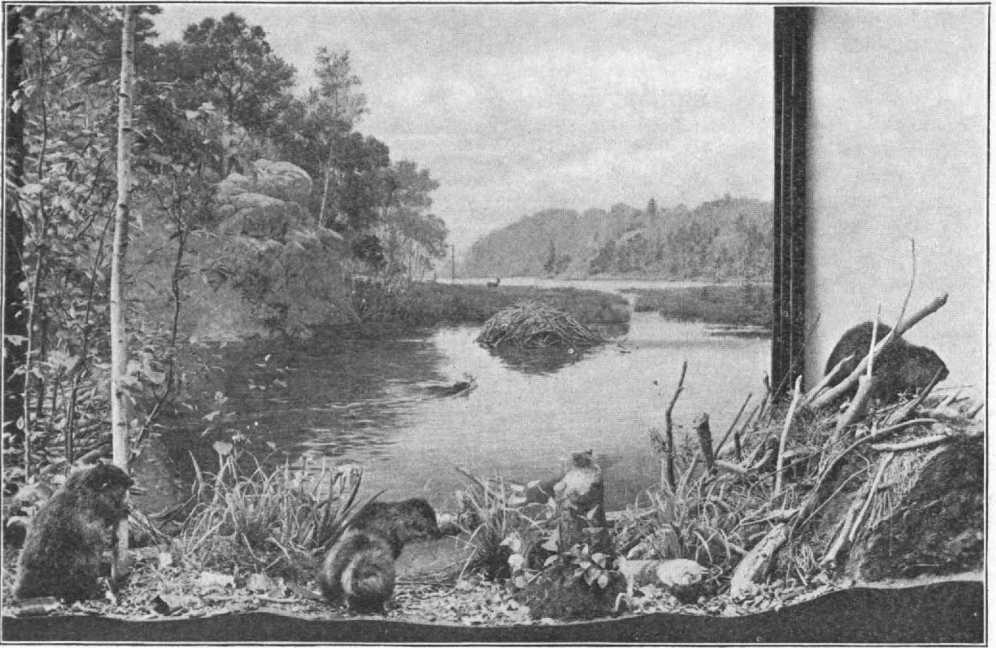
At a recent meeting of the Société des Architectes Diplomes par le Gouvernement, a society composed of the graduates of the École des Beaux Arts, it was voted to put at the disposition of the Department of Architecture at the Institute of Technology, two medals—one of gold and one of silver—to be awarded annually in competition. This competition will be held in the fourth and fifth-year classes in design, and will have for its problem some characteristic French subject.

This is the first instance where an American school of architecture has received encouragement of this particular kind.

### Tech Third in Inter-Collegiates

The New England Inter-collegiate Athletic Association met in the Stadium on May 23. Dartmouth won a big victory by piling up  $57\frac{1}{2}$  points; Maine State College was second with 28 points, and Tech third, with  $26\frac{5}{8}$  points. All the New England colleges were represented.

The best performance by a Tech man was the running of F. L. Cook in a mile race which he covered in 9 minutes,  $37\frac{1}{2}$  seconds, with a strong wind against him.



BEAVERS IN THEIR NATURAL HABITAT

This picture is from the Field Museum in Chicago and shows beavers at work constructing a dam at the left of the picture. Their house in the center of the stream is a typical beaver dwelling. It is divided into rooms and is ingeniously protected from attack and the weather. (Contributed by L. D. Gardner, '98.)

### Tech Men in Mexico

The safety of Frank D. Chase, '81, of Dedham, superintendent of the Compania Minera, at Monterey, Mexico, was in doubt for some time; but his family received a letter last month stating that he was safe, although he had lost his house and most of his personal effects.

News has reached relatives of Adolph F. Place, '03, consulting mining engineer of Oaxaca, Mexico, that he and Mrs. Place arrived at Vera Cruz from Mexico City safely.

is for the benefit of graduates of Newton high schools.

In order to eliminate any aspect looking like charity, the provision is made in the deed of gift that each recipient shall give to the Institute a note for the amount received. This is to be repaid to the fund without interest, at such time as the former student may find himself in financial condition so to do, but in the event of death before the note is paid, it is not to be considered a debt of his estate.

### New Scholarship Founded

Announcement has just been made that a scholarship at Technology has been established, and a gift of an equal amount has been made to the Department of Chemistry, by George Henry May, '92, of Newton Center, Mass.

The scholarship is a full tuition fee, and

### Weekly Luncheons in Milwaukee

The Technology Club of Milwaukee is now holding luncheons every Thursday noon at the University Club in that city. The members will be pleased to meet any visiting Tech men who will be heartily welcomed if they will drop in at that time.

## HIGHWAY ENGINEERING OPTION

Announcement made that this will be open to students in the Fall—The new demands on our highways make this course a timely addition to the curriculum

The very latest development in the constantly improving curriculum at the Institute is the establishment of courses in highway engineering. This is a special work for which the time seems ripe. The automobile has introduced into state and municipal road problems a factor of exceeding importance. Just as the advance from horse trails to wagon roads demanded a fundamental revision of the methods of road building, so the requirements of the modern auto, when applied to roads fitted for horse-drawn traffic, are now enforcing other basic changes.

Technology has in the past foreseen the demand in other specialties for engineers already prepared for special work, and in this, it is modifying some of its courses so that the student on graduation will, if he chooses, have had some special training bearing directly on the problems of construction and maintenance of modern roads.

The new option in highway engineering, this being the official designation, is related to two kinds of coöperation that are today very much in the public eye. The new work is within one of the departments affected by the recent agreements between Technology and Harvard, and a Harvard professor now associated with Technology will be the instructor. It falls also within those lines of working together to which Governor Walsh has recently called attention, whereby the special work or experience of Technology is to be put where it will be of substantial aid to city or Commonwealth. The option is to be offered by the Department of Civil and Sanitary Engineering and will be under the general supervision of Prof. Charles M. Spofford, head of this department, while the instruction in highway engineering will be given by Prof. Hector J. Hughes who comes from Harvard. In this department, that of

civil engineering, there have been heretofore two options, railroad engineering and hydraulic and sanitary engineering. These have given the student an opportunity to qualify himself in one or the other of the specialties. The young man, it should always be understood, is in this department first of all a civil engineer, thoroughly grounded in the principles underlying the general practise of the profession. He is first, last and always, an engineer and competent to make his way as such. But when one needs a man posted in the details of railroad or sanitary engineering, the specialist should be at hand with his knowledge. There has been plenty of demand for railroad and sanitary men and these professions are fixed on firm foundations. It is to effect the same relationships with the problems of highways that this, the third option in the course, has been established.

The automobile makes new demands in highway building. Its weight and speed and the combination have introduced new elements of wear to road surfaces very different from those of the horse-drawn vehicle. One may realize the tremendous strains to which the road surface is subjected when he considers that a machine of four thousand pounds' weight moving at a rate of fifty miles an hour is no curiosity. The surface must take all the strain, all the push, since action and reaction are equal, and for this reason and others the wear and tear of roads used by the auto are very substantially increased over the same items in slower-motion days. Because of the changed conditions affecting the surface of the road the problems of road engineering have been transferred to a large extent from a consideration of the resistance of woods and mineral substances to chemical questions which at present lie in the line of bitumens and oils. Road

engineering has therefore moved itself largely into the domain of chemistry.

Since the courses at Technology are fundamental during the first two years, furnishing standards upon which one or another later education may rest firmly, the new courses will not affect the present studies much during this time. In the third year the specialties which mark the courses in highway engineering to be different from its fellows will be defined and the fourth year the differences will be the more distinct. There will be less of some such matters as electrical study and more of those relating themselves to roads. So broad have always been the studies at Technology that even so distinct a matter, as this one, proves to be the amplification of work that has previously been given. It should be further understood that the new courses are strictly under-graduate and therefore differ from what at first sight seem to be similar courses here and elsewhere, which have been post-graduate in character.

No one who is not really in affairs related to the highways is likely to have any idea of the importance of these prosaic constructions in modern economy. A tabulation for 1912 is to the point, showing the expenditures for 1912 of states that were actively building roads. Altogether \$43,000,000 were expended in the country, half of which was in New York, \$23,000,000; in Pennsylvania, \$4,000,000; Maryland, \$3,370,000; and Connecticut, \$3,000,000; while Georgia, Washington and Rhode Island passed the million mark. Massachusetts spent three quarters of a million, the sum being thus low because of previous good care and large constructions. The work at Technology will recognize a number of matters, one of them being that much of the money put into roads has been expended inefficiently. This is due largely—politics of course being set out of the question—to lack of knowledge. There is need of research all along the line. This need applies to the materials of the pavement and to the construction and management of vehicles, and there are indeterminate items of great consequence like the kick of the tire or the suction of

the tire, both of which factors are new and important where the life of the road surface is considered. Another factor not evident perhaps at first sight is the need on the part of the modern road engineer of a considerable acquaintance with the principles of design in highway structures. The new vehicle, when it assumes the form of a slow-moving truck, can now carry what formerly was an impossible load. Ten tons, which the motor of today moves without difficulty over the country road may be a serious strain when the old-fashioned bridges are considered.

With reference to coöperation with state or city in the departments of highways, letters have been received by Professor Spofford which assure him that the authorities welcome such an addition to the curriculum of Technology and will afford to the students in such courses any opportunities that there may be for co-operation. The students will thereby have the advantages of practical observation and the presentation of actual conditions, while on the other hand the laboratories and experience of the Institute will be of value to the public utilities. Coöperation on the part of the Commonwealth has already been tendered by the Massachusetts Highway Commission, while L. K. Rourke, '95, Boston's commissioner of Public Works, extends similar offers of cordial relations with the further suggestion that lectures by his assistants and himself may, if desired, be included in the new course.

### Technology Club of New York

The Technology Club of New York has changed the form of its monthly bulletin so that it is now a miniature newspaper. The May bulletin sets forth the advantages offered by the new club facilities, gives a list of the officers and standing committees, and other interesting news about the club. It is cleverly illustrated, and ought to be in the hands of every Tech man. It is the kind of publicity that will do the club an immense amount of good.



## MANY CHANGES IN TEACHING STAFF

Professor Robert H. Richards, '68, head of the Department of Mining Engineering, becomes Professor Emeritus and Professor Burrison retires—Dr. Dewey head of New Course in Engineering Administration

The changes in the teaching force at the Institute, as approved by the Corporation, include two important retirements and the appointment of the head of a new course. The retirements are of Professor Robert Hallowell Richards, '68, who has been identified with the Institute since its beginning, first as student and then as instructor and professor, and Professor Henry K. Burrison, '75, of the department of drawing, who has been connected with the department since 1877.

The important change in the appointments is the placing of Professor Davis R. Dewey in charge of the new course (XV) entitled, "Engineering Administration." Following is the list of other new appointments:

### APPOINTMENTS

#### *Assistants*

Francis C. Atwood, Oliver E. Conklin, Joseph W. Horton and Harold A. Mayer, in physics for one year; Alden B. Chamberlain and Percy G. Savage, in inorganic chemistry for one year; Charles S. Venable in organic chemistry for one year; Bertrand E. Hale, Lester F. Hamilton, Benjamin T. Rauber and W. H. McAdams, in analytical chemistry, for one year; William A. Simpson, Robert V. Townsend and Roger Williams, in theoretical chemistry for one year; Hiram Y. Waterhouse, in technical analysis for one year; William G. Horsch, in electro-chemistry for one year; Ross H. Dickson, research assistant in applied chemistry; Lester F. Hoyt, research assistant in chemistry of sanitation; and Isaburo Wada, associate in physical chemistry.

Arthur C. Melcher is appointed purchasing agent of the chemical department.

### REAPPOINTMENTS

#### *Instructors*

C. E. Morrow, C. Everett and W. T. Aldrich, in architecture; C. Howard

Walker, in history of ornament; Percy G. Stiles, in biology for one year; Eugene C. Howe, in biology for two years; George W. Rolfe, in sugar analysis for one year; Frederick R. Kneeland, in organic chemistry for two years; Stephen A. Breed, Ralph G. Overland and Arthur L. Goodrich, in mechanical drawing and descriptive geometry for two years; Frank M. Gracey, in drawing for two years; Ralph G. Hudson, Waldo V. Lyon and F. G. Perry, in electrical engineering for two years; C. C. Batchelor, David Carb, C. H. Colleston, Robert E. Rogers and Herbert W. Smith, in English for two years; John D. MacKenzie, in geology for two years; H. B. Phillips and Joseph Lipka, in mathematics for two years; C. E. Littlefield, in chipping and filing for two years; J. F. O'Neill, in woodwork and foundry-work for two years; Robert H. Smith, in machine tool work for two years; Roy G. Burnham, Irving H. Cowdrey, Myron W. Dole and Addison F. Holmes, in mechanical engineering for two years; Walter Humphreys, in mechanism for two years; M. C. MacKenzie, in mechanical engineering for two years; Rufus C. Reed, in mining engineering and metallurgy, for two years; Frank M. Kanaly, in physical training for two years; William R. Barss, in physics for two years; Gordon B. Wilkes, in heat measurements for two years.

#### *Assistants*

Frederick W. Lane, in organic chemistry for one year; F. H. Achard, Henry C. Harrison, R. E. Leonard and R. S. Rankin, in electrical engineering for one year; H. F. Thomson, to the director of the Research Laboratory of Electrical Engineering for one year; Harry G. Davies, in woodwork and foundry-work for one year; Arthur B. English, in machine tool work for one year; Harry M. Mosher, in

chipping and filing for one year; James R. Shorrock, in machine tool work for one year; Edward G. Taylor, in physics for one year; L. A. Salinger, in food analysis for one year; Ruth M. Thomas, research assistant in organic chemistry for one year; Charles E. Cole and Robert Stoddart, lecture assistants to the professors in chemistry; Elof Benson, lecture assistant to the professors on physics.

Edward F. Rockwood is reappointed special lecturer on concrete design.

#### RESIGNATIONS

##### *Assistants*

Carl N. Anderson, in mining engineering and metallurgy; Charles L. Burdick, in theoretical chemistry; John P. Constable, in naval architecture; Robert G. Daggett, research assistant in sanitary chemistry; James H. Ellis, Warren K. Green and Francis B. Morton, in physics; Warren E. Glancy and Leon W. Parsons, in analytical chemistry; F. H. Pendleton, in technical analysis; Clarence K. Reiman, Charles F. Walton and S. A. S. Strahan, in organic chemistry; Philip B. Terry, in organic chemistry; W. L. Whitehead, in geology; W. J. Winninghoff, in theoretical chemistry and in mathematics.

##### *Instructors*

Ernest D. Wilson, research assistant in physical chemistry; T. S. Holden, in mathematics; Joseph P. Maxfield, in physics; W. J. Murray, in analytical chemistry; Ferdinand M. Reyher, in English; Ralph H. White, in organic chemistry and theoretical chemistry; Rufus E. Zimmerman, in theoretical chemistry.

#### Tech-Harvard Chemists Dine

At the spring meeting of the American Chemical Society, which was held in Cincinnati the early part of April, a combination Tech-Harvard dinner was given at Hotel Sinton, and the following named chemists were present: (of Harvard) Theodore W. Richards, '86, president, American Chemical Society; Arthur M. Comey, '82; William B. Bentley, '89; Carl L. Alsberg, '96, Columbia (former instructor at Harvard); Lawrence J.

Henderson, '98; Isaac K. Phelps, '98; William J. Hale, '98; E. Mallinckrodt, Jr., '00; Roger C. Wells, '01; A. C. Boylston, '03; H. C. Chapin, '04; Philip A. Kober, '06; Harold F. Rogers, '08; H. H. Willard, '09; W. B. Holmes, '96; (of M.I.T.) Henry P. Talbot, '85; Charles G. Merrell, '88; Willis R. Whitney, '90; Severance Burrage, '92; R. W. Proctor, '94; Carleton Ellis, '00; W. H. Whitcomb, '03; A. C. Downes, '04; Edwin A. Barrier, '05; C. R. Boggs, '05; Bradley Dewey, '08 Harvard, and '09 M.I.T.

#### Good Work of Finance Committee

The annual meeting of the Undergraduate Finance Committee, held May 13, at the Technology Club, showed a very encouraging improvement for the year. All the activities were solvent; most of them had made great advances since the last annual meeting.

A new form of report for treasurers has been adopted, and is much more satisfactory than the old one. These reports are made to the secretary of the committee monthly by the treasurers of all the student activities.

Some new projects to be tried out next year were discussed. The committee has had its hands full to establish uniform bookkeeping and a monthly system of reports, but now that the routine work has been thoroughly tried out and settled upon, it will take upon itself other responsibilities which will have to do with the finances of the various activities.

#### President Maclaurin Honored

At the inauguration of Dr. Clarke Welles Chamberlain as president of Dennison University, Greenville, Ohio, May 20, the degree of LL.D. was conferred upon Richard C. Maclaurin, president of the Institute of Technology, who was present at the inauguration. The same degree was also conferred upon Ernest F. Nichols, president of Dartmouth; W. H. P. Faunce, president of Brown; William E. Castle, of Harvard, and the degree of D.D. was conferred upon the Rev. John Herget, of Cincinnati.

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To be admitted to the Institute, the applicant must have attained the age of seventeen years and must pass examinations in algebra, plane and solid geometry, physics, history of the United States (or ancient history), English, French and German. Preparation in some one of a series of elective subjects is also required. A division of these examinations between different examination periods is allowed. In general, a faithful student who has passed creditably through a good high school, having two years' study of French and German, should be able to pass the Institute examinations.

Graduates of colleges, and in general all applicants presenting certificates representing work done at other colleges, are excused from the usual entrance examinations and from any subjects already satisfactorily completed. Records of the College Entrance Examination Board, which holds examinations at many points throughout the country and in Europe, are also accepted for admission to the Institute.

Instruction is given by means of lectures and recitations, in connection with appropriate work in the laboratory, drawing-room or field. To this end extensive laboratories of chemistry, physics, biology, mining, mechanical engineering, applied mechanics, and the mechanic arts, have been thoroughly equipped, and unusual opportunities for field-work and for the examination of existing structures and industries have been secured. So far as is practicable, instruction is given personally to small sections rather than by lectures to large bodies of students.

The regular courses are of four years' duration, and lead to the degree of Bachelor of Science. In most courses the work may also be distributed over five years by students who prefer to do so. Special students are admitted to work for which they are qualified; and the degrees of Master of Science, Doctor of Philosophy, and Doctor of Engineering are given for resident study subsequent to graduation. Opportunity for research is offered in all the departmental laboratories, in the three recently established Research Laboratories of Applied Chemistry and Physical Chemistry, and in the Sanitary Research Laboratory and Sewage Experiment Station.

The tuition fee, not including breakage in the laboratories, is \$250 a year. In addition, \$30 to \$35 per year is required for books and drawing materials.

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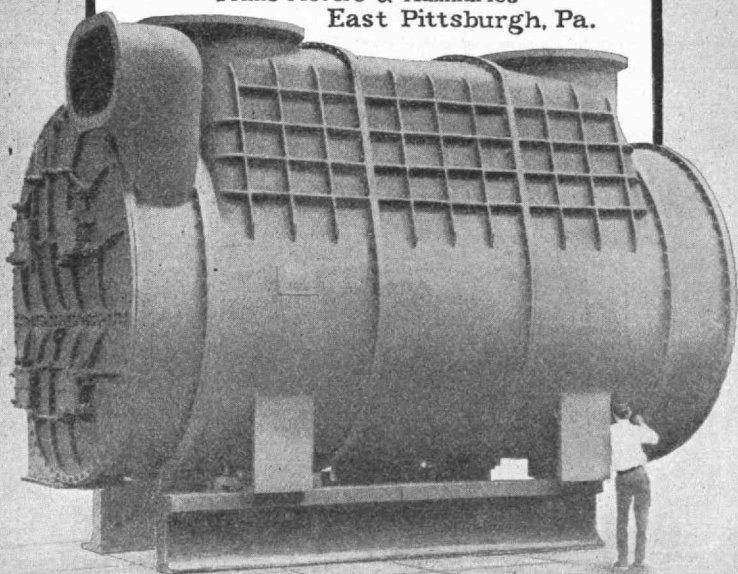
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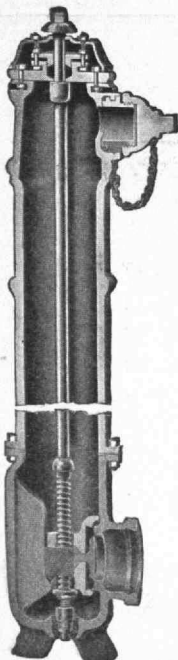
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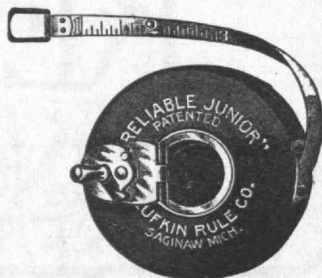
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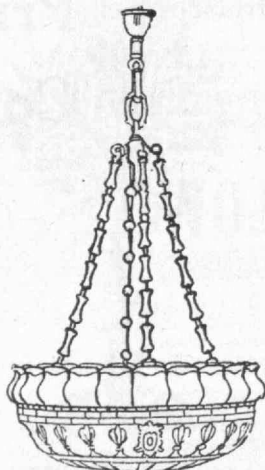
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